CITY OF LANSING, MICHIGAN

Lansing Combined Sewer Overflow (CSO) Control Program

PROJECT PLAN AMENDMENT NO. 3

April 2007

Virg Bernero, Mayor

PUBLIC SERVICE DEPARTMENT
732 City Hall
124 West Michigan Avenue
Lansing, Michigan 48933
(517) 483-4455
FAX: (517) 483-6082
http://publicservice.cityoflansingmi.com

April 3, 2007

Mr. Chad Gamble, P.E., Director
Lansing Public Service Department
732 City Hall
124 W. Michigan Avenue
Lansing, MI 48933

RE: Lansing CSO Control Program
Project Plan Amendment No. 3 - DRAFT

Dear Mr. Gamble,

Please find enclosed three copies of the draft Project Plan Amendment No. 3. for your review. For this amendment, we reviewed updated costs and benefits for sewer separation and combined retention, as well as the updated separation plan for remaining CSO areas. Based on this we find that sewer separation remains the most cost-effective alternative and would provide the best system performance and greatest environmental benefit for Lansing.

Following is the proposed schedule for submittal. The schedule is fairly tight. Please recall that the deadline for submittal of the project plan amendment to DEQ is July1, which is a Sunday this year, so allowing one business day of slack, we have scheduled delivery of the final documents to the City and DEQ for Thursday, June 28. Meeting this schedule qualifies the City for prioritization on the SRF Project Priority List (PPL) for the following fiscal year.

PROPOSED SCHEDULE

Preliminary Draft to City and DEQ:		04/03/07
Advertise Public hearing:		04/15/07
Conduct Public Hearing:		05/17/07
City Council Resolution:	By	06/11/07
Final Document to City and DEQ:	By	06/28/07

Please review the document and let me know when you can meet to review any comments you may have. Thank you for this opportunity to assist the City of Lansing with the CSO Control Program.

Sincerely,

Kevin Vander Tuig, P.E.
Program Manager, Tetra Tech

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COMBINED SEWER OVERFLOW CONTROL
PROJECT PLAN AMENDMENT NO. 3
EXECUTIVE SUMMARY

In April 1991, the City of Lansing prepared a Project Plan for the purpose of providing an approvable Combined Sewer Overflow Control (CSO) program, as required by the National Pollutant Discharge Elimination System (NPDES) Permit, in effect at that time. CSO Control is required by the State of Michigan to prevent untreated sewage discharges to local water ways. The Michigan Department of Natural Resources (MDNR), now the Michigan Department of Environmental Quality (DEQ), approved the original project plan on April 1, 1992.

The project plan was also required for the City to qualify for project funding from the Michigan State Revolving Fund (SRF) Loan Program. The SRF loan program provides low-interest loans for financing wastewater treatment facilities, including CSO Control projects. To date, the City of Lansing has received 19 SRF loans for construction of the CSO projects totaling more than $156 million. The City of Lansing has satisfactorily met all project schedules since the inception of the planning phase of the project.

Due to the size and cost of the Lansing CSO Program, construction is being spread over six phases and 28 years. The SRF Program also requires the project plan to be updated every five years until the project is completed in 2020. Project Plan Amendments 1 and 2 were submitted in 1997 and 2002, respectively. Amendment No. 3 is due to the DEQ BY July 1, 2007.

NEED FOR PROJECT

The necessity of the CSO Control Program was documented in the 1991 Project Plan. Failure to implement the program would place the City of Lansing in non-compliance with the requirements of the NPDES permit. A copy of the current NPDES permit is attached as Appendix A. Basement flooding occurs in some homes located in combined sewer areas during wet weather periods. Several water quality problems in the Grand

River and the Red Cedar River were documented by the Tri-County 208 Plan, which directly linked the problems with the 40 combined sewer overflows. CSO sewer separation is keeping the City in compliance with State and Federal law, and helping to mitigate basement flooding and water quality problems.

CSO CONTROL PROGRESS

When CSO sewer separation construction began in 1992, there were 40 CSO structures and over 6,700 acres of combined sewer area. By the end of the 2006 construction season, 16 CSO structures (40 percent) were abandoned, 3,106 acres were separated, and 443 acres of sanitary sewer area were redirected away from combined sewer areas, so that now all separate sanitary sewer areas discharge directly to the Lansing Wastewater Treatment Plant. Sewer separation is approximately 50% complete based on areas separated and redirected from combined sewer outfalls. Table 1 provides a list of CSO separation areas and outfalls abandoned for projects initiated to date. Figure 1 shows Lansing CSO Phasing, and separated areas in light green. Following is a summary of progress through the 2006 construction season.

Construction

- Total 1991 combined sewer tributary area, acres: 7,167
- Combined area separated by the City of Lansing, acres: 2,880
- Combined area separated by others (Tollgate Drain): 226
- Separated sewer area redirected from combined sewer areas (Red Cedar Area M): 443
- Total area removed from contribution to overflow: 3,549 (50%)
- Total number of CSO structures abandoned: 16 of 40 (40%)
- New sanitary sewer constructed, miles: 43
- New water main constructed, miles: 20
- New roadway constructed, miles: 50
- Average annual overflow before project: 1.65 billion gallons
- Average annual overflow removed to date: 550 million gallons (33%)

Benefits of CSO Control/Sewer Separation

- Clean rivers (public health protection, aquatic habitat improvement, recreational opportunities, and increased property values)
- Basement flooding/SSO mitigation
- Streetscape and Infrastructure enhancement (green space, tree preservation, road improvements, water main and other utility upgrades)
- Improved reliability / capacity of new Lansing Avenue Pump Station (LAPS)
- More efficient and reliable wastewater treatment plant operation
- Improvement sewage collection and transportation system
- Cost-effective and reliable sewer system maintenance
- Meets MDEQ/USEPA requirements

Private Inflow Removal

- Properties inspected: 9,480
- Properties with inflow sources identified: 1,892
- Percentage of inflow properties where sources have been removed: 82%
- Percentage of all properties in compliance: 96%

Sewer separation has so far proved to be a very successful CSO control methodology for the City of Lansing. Other than the May 15-16, 2001, flooding event in the Tollgate Drain Area, there have been no cases of basement flooding in a completed CSO separation area due to wet weather flows. The May 2001 event has been shown to exceed a 100-year storm in and around the area where flooding occurred.

TABLE 1

ACREAGE SEPARATED AND CSO OUTFALLS ABANDONED TO DATE

Phase	Segment	SRF No. 5005-	Area Separated To Date, Acres	CSO Outfalls Abandoned/ Area Separated	Approximate Construction Completion Data
I	1	01	298	028, 029, 030, 031, 035, 036, 038, 039, 040	11/93
I	2	02	56	043	6/94
II	1	03, 04	11	Foster Avenue Sanitary Interceptor South and Pere Marquette Street	1/96
II	2	05, 06	156	041, Foster Avenue Sanitary Interceptor *North	6/96
II	3	07, 08	678	Area I, J, and Tollgate Drain	12/97
II	4	09	251	022 West**	12/98
II	5	10	18	Red Cedar Area K Sanitary Interceptor (by MDOT)	9/99
III	1	11	352	Northeast Sanitary Interceptor and Red Cedar Areas G and H	6/2002 11/2001
III	2	12	347	Moores Park Trunk Sewer and Red Cedar Area K	8/2001 10/2002
III	3	13	211	013 South	4/2003
III	4	14	276	037	12/2003
III	5	15	80	044	8/2004
IV	1	16, 17	455	018 East, 025, Capitol Loop	10/2005
IV	2	18	265	018 North, St. Joseph St	12/2006
IV	3	19	95	023, 013 West, Dumpster Alley, Michigan Ave	Ongoing
	Total		3,549		

* Construction of the Foster Avenue Interceptor provided a separate sanitary sewer outlet for 347 acres of previously separated area north of Hopkins Ave that had been flowing into the CSO regulator 042 service area.

** Separation of 022 West provided a separate sanitary sewer outlet for 96 acres of previously separated area that had been flowing into the CSO regulator 022 service area.

PROJECT PLAN AMENDMENT SUMMARY

Amendment No. 1 (Phase II, Segments 4-5 and Phase III, Segments 1-3)

Project Plan Amendment No. 1 was prepared in 1997 and approved by the DEQ in April 1998. The amendment focused on the proposed work to occur at the Lansing Ave Pump Station (LAPS), including:

- Delay construction of the equalization basin at the LAPS site to determine if the basin would be necessary, based on post-separation flows
- Reconstruct LAPS to remedy safety, reliability and capacity deficiencies in the 55-year old facility.
- Reiterates that sewer separation remains the recommended alternative for CSO Control in Lansing

Amendment No. 2 (Phase III, Segments 4-5 and Phase IV, Segments 1-3

Project Plan Amendment No. 2 was prepared in 2002 and included:

- Updated progress of Lansing's CSO Control Program
- Information regarding changes to the original Project Plan
- Advancing of work in the Capitol Loop area of downtown to coincide with the Michigan Department of Transportation (MDOT) roadway and streetscape reconstruction project
- Supplemental detail of the next five work segments
- Reiterates that sewer separation remains the recommended alternative for CSO Control in Lansing

Amendment No. 3 (Phase IV, Segments 4-5 and Phase V, Segments 1-3)

This Project Plan Amendment No. 3 is due by July 1, 2007, and addresses the following:

- Updates the progress of Lansing's CSO Control Program
- Provides supplemental detail of the next five work segments
- Incorporates recommendations of the 2020 Infrastructure Task Force to bring forward in the program some of the downtown projects, and
- Reiterates that sewer separation remains the recommended alternative for CSO Control in Lansing.

- Defers design and construction of the LAPS equalization basin to Phase VI to continue assessing the need for the basin and the volume required.

CSO CONTROL ALTERNATIVES AND COST EFFECTIVENESS

The 1992 CSO Project Plan included three alternatives, complete separation, maximum retention, and partial retention. Sewer separation was found to be the cost-effective alternative.

The recommended alternative of separation was further supported by an independent review completed by Camp Dresser & McKee (CDM) in 1998. The CDM review found that the cost-effectiveness analysis favored sewer separation even more than indicated in the original 1991 Project Plan.

This Amendment 3 report reconsiders the primary alternatives for the remaining CSO subareas. Table 2 summarizes the updated cost effectiveness for remaining CSO subareas where combined retention is considered feasible. The conceptual cost opinions are based on recent actual construction costs escalated to the January 2007 ENR index of 7880, and include only SRF eligible sewer activity.

TABLE 2

CONSTRUCTION COST COMPARISON-AREAS VIABLE FOR COMBINED RETENTION

CSO Subareas	Sewer Separation	Retention 1 1991 Project Plan Capture 1-yr, 1=hr 30 Min 10-yr, 1-hr	Retention 2 CDM 1998 Capture 1-yr, 1-hr storm
008, 009, 012, 015, 019	$54,819,000	$75,864,000	$65,588,000
021, 022, 024, 046	$69,609,000	$93,706,000	$90,939,000
032 and 034 (No 037)	$61,868,000	$86,715,000	$61,758,000
032 (No 037 or 034)	$19,714,000	$29,224,000	$22,841,000

Notes:

- The cost figures are based on SRF eligible activity and does not account for other ineligible activity related to sanitary sewers, storm sewers, and roads
- The cost figures do not incorporate any participation by the BWL, either eligible or ineligible.
- The retention options do not include the purchase of property if needed for locating it, special treatments if located in a park, nor sewer system rehabilitation.
- The costs are only for construction of the facilities and do not take into consideration long term operation, maintenance and replacement (OM&R) costs. OM&R costs tend to be higher for facilities and equipment than for sewers.

CONCLUSION

The CSO Control Program Plan has proven to be very effective thus far and sewer separation remains the recommended alternative for CSO Control in Lansing. Projected environmental impacts and mitigating measures remain unchanged from those discussed in the original project plan and included in the 1992, 1998, and 2003 Findings of No Significant Impact (FONSIs).

PROPOSED SCHEDULE FOR AMENDMENT NO. 3

Preliminary Draft to City and MDEQ:		04/03/07
Advertise Public hearing:		04/15/07
Conduct Public Hearing:		05/17/07
City Council Resolution:	By	06/11/07
Final Document to City and DEQ:	By	06/28/07

REMAINING WORK

CSO construction for the next five years includes Phase IV, Segments 4 and 5 and Phase V, Segments 1, 2, and 3 as shown in Table 3 and Figure 1.

Project Costs Remaining

Table 3 also summarizes the project cost opinions for all future segments. The cost opinions include engineering and a 10 percent contingency for construction. The opinion of total project cost for the next five segments is $146.9 million. The opinion of eligible project cost for the five segments is $102.6 million. The opinion of total eligible project cost for all remaining work is $241.1 million.

Cost to Average Residential User

The estimated monthly cost to a typical residential user for the next SRF loan (Phase IV, Segment 5) is $1.20.

TABLE 3

LANSING CSO CONTROL PROGRAM REMAINING WORK

Phase	Segment	Description	Project Period	Construction Start Year	Opinion of Eligible Project Cost ENR 7880 Million $
IV	4	Separation of Subareas 020, 018SE, 013NW, and Downtown	2005 - 2010	2007	26.0
	5	Separation of Subareas 045, 018SW, 013NE, 034A and Downtown	2006 - 2011	2008	19.1
V	1	Separation of Subareas 015N (014), 034B, and Downtown	2007 - 2012	2009	17.0
	2	Separation of Subareas 034C, 032 Trunk, and Downtown	2008 - 2013	2010	19.2
	3	Separation of Subareas 015S (014), 034D, and Downtown	2009 - 2014	2011	21.4
	4	Separation of Subareas 034E, 032 Local and Downtown	2010 - 2015	2012	16.6
	5	Separation of Subareas 009 (010) and Downtown	2011 – 2016	2013	16.7
VI	1 - 5	Separation of Subareas 008, 012 (011), 016, 017, 019, 026, and 033, and completion of downtown separation for Subareas 021, 22E, 024, and 046 (047), Lansing Ave Retention Basin. Improvements to the WWTP	2012 – 2020	2014 – 2018	105.1

- The project period generally includes 1.5 years for design and DEQ approval, 2 years for construction and 1 year for PPC monitoring and report.
- The need for a basin and improvements at the WWTP will depend on flows from separated areas and the approach the City takes to address Sanitary Sewer Overflows.
- Construction costs include 10% contingency.
- Eligible project costs have been approximated to include 70% of the total project cost

PUBLIC PARTICIPATION

A public hearing was held on Thursday, May 17, 2007, at 7:00 p.m. in the Lansing City Council Chambers to receive comment on the Draft CSO Project Plan Amendment No. 3. A notice of public hearing was published in the *Lansing State Journal* on Sunday, April 15, 2007 and the *Lansing City Pulse* on Monday April 16, 2007. Copies of the Draft CSO Project Plan Amendment No. 3 were made available for public inspection by the publication date of the notice of the public hearing. The period for receipt of written comments also ended on Thursday, May 17, 2007.

The following items will be included in Appendix C of Amendment No. 3:

- Public hearing and written comment advertisement and affidavit
- Hearing agenda
- Executive Summary handout
- List of attendees
- List of Speakers
- Transcript of hearing
- Responsiveness summary addressing questions and comments received
- Resolution adopting selected plan, passed by Lansing City Council

INTRODUCTION

This Project Plan Amendment No. 3 was prepared on behalf of the City of Lansing to obtain State Revolving Fund (SRF) loans for the next five years of CSO control construction projects. The original project plan was prepared in April 1991. It provided an approvable Final CSO Control Program as required by the 1987 NPDES permit.

The DEQ released a Finding Of No Significant Impact (FONSI) on February 27, 1992, for the proposed project, based on the findings in the original Project Plan, and approved the plan on April 1, 1992. The requirements of the SRF Loan Program include the provision that a FONSI on a segmented project remain in effect for five years. Should the total project require a time frame for the commencement of all segments greater than five years, a new FONSI must be released. This action helps ensure that the project plan remains applicable and essentially the same as the original plan. If changes are necessary, they are to be addressed in a new FONSI.

The following reports and studies have been previously prepared in connection with Lansing's CSO Control Program:

- "Report on Combined Storm Water Facilities," Lansing, Michigan, July 1972, McNamee, Porter and Seeley, Inc.
- "Lansing, Michigan Combined Sewer Overflow Draft Report," October 1978, McNamee, Porter and Seeley, Inc.
- "Red Cedar Segment of the Facilities Plan of Lansing," April 1980, Capital Consultants, Inc.
- "Lansing, Michigan, Final Facilities Plan," April 1980, McNamee, Porter and Seeley, Inc.
- "City of Lansing, Michigan, CSO Progress Report," October 1989, McNamee, Porter and Seeley, Inc.

- "City of Lansing, Michigan, Combined Sewer Overflow Interim Report," November 1990, McNamee, Porter and Seeley, Inc., in association with Capital Consultants, Inc., and Snell Environmental Group, Inc.
- "City of Lansing, Michigan, Combined Sewer Overflow Control Project Plan - Final", April 1991, McNamee, Porter and Seeley, Inc., in association with Capital Consultant, Inc., and Snell Environmental Group, Inc.
- "Lansing Combined Sewer Overflow Control Project Plan Supplement I (Phase II Detail)," April 1993, McNamee, Porter and Seeley, Inc.
- "Combined Sewer Overflow Control Project Plan Supplement II (Detail of Phases II and III)," December 1995, McNamee, Porter and Seeley, Inc.
- "Combined Sewer Overflow Control Project Plan Amendment No. 1", April 1997, McNamee, Porter and Seeley, Inc.
- "Combined Sewer Overflow Project Evaluation Final Report", July 1998, Camp Dresser & McKee
- "Combined Sewer Overflow Control Project Plan Amendment No. 2", June 2002, Tetra Tech MPS
- "Mayor's Downtown 2020 Infrastructure Task Force", November, 2004, Tetra Tech

This Amendment No. 3 provides information regarding Lansing's CSO Control Program in the following sections:

- CSO Control Program Overview
- CSO Control Progress Update
- Summary of Project Plan Changes to Date
- CSO Control Alternatives
- Remaining Work
- Public Participation

CSO CONTROL PROGRAM OVERVIEW

In April 1991, the City of Lansing prepared a Project Plan for the purpose of providing an approvable Combined Sewer Overflow Control (CSO) program, as required by the National Pollutant Discharge Elimination System (NPDES) Permit, in effect at that time. The Michigan Department of Natural Resources (MDNR), now the Michigan Department of Environmental Quality (DEQ), approved the original project plan on April 1, 1992. The project plan was also required for the City to qualify for project funding from the Michigan State Revolving Fund (SRF) Loan Program. The SRF loan program provides low-interest loans for financing wastewater treatment facilities, including CSO Control projects. Due to the size and cost of the Lansing CSO Program, construction is being spread over six phases and 28 years.

FIVE YEAR ENVIRONMENTAL REVIEW PERIOD

This document provides an update for the next five-year environmental review of the project plan, as required by the SRF Program. The SRF Program requires that the project plan for a segmented project be updated every five years until the project is completed. The original Project Plan was prepared in April 1991, and approved by MDNR on April 1, 1992. Project Plan Amendment No. 1 was prepared in April 1997, and approved by DEQ in April 1998. Project Plan Amendment No. 2 was prepared in June 1997, and approved by DEQ in January 2003. This five-year environmental review period will include Phase IV, Segments 4 and 5, and Phase V, Segments 1, 2, and 3.

COMPLETED PROJECTS

Table 1 summarizes sewer separation work completed to date.

TABLE 1

LANSING SEWER SEPARATION WORK COMPLETED

Phase	Segment	SRF No. 5005-	Area Separated To Date, Acres	CSO Outfalls Abandoned/ Area Separated	Approximate Construction Completion Data
I	1	01	298	028, 029, 030, 031, 035, 036, 038, 039, 040	11/93
I	2	02	56	043	6/94
II	1	03, 04	11	Foster Avenue Sanitary Interceptor South and Pere Marquette Street	1/96
II	2	05, 06	156	041, Foster Avenue Sanitary Interceptor *North	6/96
II	3	07, 08	678	Area I, J, and Tollgate Drain	12/97
II	4	09	251	022 West**	12/98
II	5	10	18	Red Cedar Area K Sanitary Interceptor (by MDOT)	9/99
III	1	11	352	Northeast Sanitary Interceptor and Red Cedar Areas G and H	6/2002 11/2001
III	2	12	347	Moores Park Trunk Sewer and Red Cedar Area K	8/2001 10/2002
III	3	13	211	013 South	4/2003
III	4	14	276	037	12/2003
III	5	15	80	044	8/2004
IV	1	16, 17	455	018 East, 025, Capitol Loop	10/2005
IV	2	18	265	018 North, St. Joseph St	12/2006
IV	3	19	95	023, 013 West, Dumpster Alley, Michigan Ave	Ongoing
	Total		3,549		

* Construction of the Foster Avenue Interceptor provided a separate sanitary sewer outlet for 347 acres of previously separated area north of Hopkins Ave that had been flowing into the CSO regulator 042 service area.

** Separation of 022 West provided a separate sanitary sewer outlet for 96 acres of previously separated area that had been flowing into the CSO regulator 022 service area.

SRF LOAN FINANCING

To date, the City of Lansing has received 19 SRF loans for construction of the CSO projects totaling more than $156 million. The first loan was awarded in 1992. Since that

time 15 construction segments in Phases I, II, III and IV have been financed using SRF loans. The City of Lansing has satisfactorily met all project schedules since the inception of the project. The total CSO control program will be completed in 27 segments, with the final segment completed in the year 2019.

The cost of the total CSO program was projected to be approximately $176 million in the 1991 Project Plan (ENR Index 5000). The opinion of total project cost for the next five segments of construction covered in this Amendment No. 3 (Phase IV, Segments 4, 5 and Phase V, Segments 1-3) is $146.9 million (January 2007, ENR Index 7880). The opinion of eligible project cost for the next five segments of construction is $102.6 million (January 2007, ENR Index 7880).

NEED FOR PROJECT

The necessity of the CSO Control Program was documented in the 1991 Project Plan. Failure to implement the program would place the City of Lansing in non-compliance with the requirements of the NPDES permit. A copy of the current NPDES permit is attached as Appendix A. Basement flooding occurs in some homes located in combined sewer areas during wet weather periods. Several water quality problems in the Grand River and the Red Cedar River were documented by the Tri-County 208 Plan, which directly linked the problems with the 40 combined sewer overflows. CSO sewer separation is keeping the City in compliance with State and Federal law, and helping to mitigate basement flooding and water quality problems.

PROJECT PLAN AMENDMENT NO. 1 – MAY 1997

Project Plan Amendment No. 1 focused on the proposed work to occur at the Lansing Ave Pump Station (LAPS). It was proposed in that document that construction of the equalization basin should be delayed until later in the CSO program, and that LAPS should be replaced prior to basin construction. Design and construction of an equalization basin at the LAPS site was delayed to allow more sewer separation to be completed, and flow data collected to project the required basin volume. The storage would help protect the wastewater treatment plant from problems associated with peak

flow rates during design wet weather conditions. The City of Lansing is considering redirection of footing drain flows away from the sanitary sewer system. This is becoming more common across the country, and if implemented in Lansing, would reduce, or even eliminate the need for sanitary sewage equalization basins.

In the original project plan, the proposed project only included the construction of a new equalization basin. However, it became apparent that the first priority was to replace LAPS because:

- The existing station was over 55 years old.
- The wet well was too small.
- The available space within the station was inadequate.
- The station was unreliable.

LAPS is the most important pumping station in Lansing, and it is imperative that it operate efficiently and reliably. The new station became fully operational in November 1999.

PROJECT PLAN AMENDMENT NO. 2 – June 2002

The primary objectives of this Project Plan Amendment No. 2 were to update the progress of Lansing's CSO Control Program, provide information on any changes to the original Project Plan, provide supplemental detail of the next five work segments, and reiterate that sewer separation remains the recommended alternative for CSO Control in Lansing. The recommended alternative of separation was further supported by an independent review completed by Camp Dresser & McKee (CDM) in 1998. At the time of the review, it was even more cost effective to continue with the current program

The only modification to the Project Plan by Amendment No. 2 moved forward the downtown separation activity in the Capitol Loop area. This area was moved forward to reduce cost to the City for the separation activity by doing it in conjunction with MDOT and their street project.

PROJECT PLAN AMENDMENT NO. 3

The primary objectives of this Project Plan Amendment No. 3 are to update the progress of Lansing's CSO Control Program, provide supplemental detail of the next five work segments, incorporate recommendations of the 2020 Infrastructure Task Force bringing forward in the program some of the downtown projects, and reiterate that sewer separation remains the recommended alternative for CSO Control in Lansing.

ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

Projected environmental impacts and mitigating measures remain unchanged from those discussed in the original project plan and included in the 1992 Finding of No Significant Impacts (FONSI).

POPULATION AND ECONOMIC DATA

The population of Lansing has continued a slow decline since the 1991 Project Plan. The 2000 Census lists a population of 119,128 and an estimated 2003 population of 118,379. The median household income for the City of Lansing has increased to $34,833, and the per capita income to $17,924. (See Appendix D for details)

PROPOSED SCHEDULE FOR AMENDMENT NO. 3

Preliminary Draft to City and MDEQ:		04/03/07
Advertise Public hearing:		04/15/07
Conduct Public Hearing:		05/17/07
City Council Resolution:	By	06/11/07
Final Document to City and DEQ:	By	06/28/07

CSO CONTROL PROGRESS UPDATE

Lansing will begin construction of its 16th CSO Segment (20th SRF Loan) in the spring of 2007, when Phase IV, Segment 4 separation gets underway. When CSO sewer separation construction began in 1992, there were 40 CSO structures and over 6,700 acres of combined sewer area in Lansing. By the end of the 2006 construction season, 16 CSO structures (40 percent) were abandoned, 3,106 acres were separated, and 443 acres of sanitary sewer area were redirected away from combined sewer areas, so that now all separate sanitary sewer areas discharge directly to the Lansing Wastewater Treatment Plant.

As of the end of the 2006 construction season, sewer separation is approximately 50% complete by area. The projects to date have been constructed with minimal problems, delays, and change orders. Regulator abandonment has occurred in accordance to the schedule required in the NPDES Permit. Following is a summary of CSO control progress, as of the end of the 2006 construction season:

CSO CONSTRUCTION

- Total 1991 combined sewer tributary area, acres: 7,167
- Combined area separated by the City of Lansing, acres: 2,880
- Combined area separated by others (Tollgate Drain): 226
- Separated sewer area redirected from combined sewer areas (Red Cedar Area M): 443
- Total area removed from contribution to overflow: 3,549 (50%)
- Total number of CSO structures abandoned: 16 of 40 (40%)
- New sanitary sewer constructed, miles: 43
- New water main constructed, miles: 20
- New roadway constructed, miles: 50
- Average annual overflow before project: 1.65 billion gallons
- Average annual overflow removed to date: 550 million gallons (33%)

BENEFITS OF CSO CONTROL/SEWER SEPARATION

- Clean rivers (public health protection, aquatic habitat improvement, recreational opportunities, and increased property values)
- Basement flooding/SSO mitigation
- Streetscape and Infrastructure enhancement (green space, tree preservation, road improvements, water main and other utility upgrades)
- Improved reliability / capacity of new Lansing Avenue Pump Station (LAPS)
- More efficient and reliable wastewater treatment plant operation
- Improvement sewage collection and transportation system
- Cost-effective and reliable sewer system maintenance
- Meets DEQ/USEPA requirements

PRIVATE INFLOW REMOVAL

- Properties inspected: 9,480
- Properties with inflow sources identified: 1,892
- Percentage of inflow properties where sources have been removed: 82%
- Percentage of all properties in compliance: 96%

Sewer separation has so far proved to be a very successful CSO control methodology for the City of Lansing. Other than the May 15-16, 2001, flooding event in the Tollgate Drain Area, there have been no cases of basement flooding in a completed CSO separation area due to wet weather flows. The May 2001 event has been shown to exceed a 100-year storm in and around the area where flooding occurred.

SUMMARY OF PROJECT PLAN CHANGES TO DATE

The Lansing CSO Control Program is essentially the same as what was presented in the original 1991 Final Project Plan. The construction of the first segment began in 1992, and the final segment will be completed in the year 2019. The following is a summary of the changes to the CSO Control Program since the 1991 Project Plan.

AMENDMENT NO. 1

Project Plan Supplement I

- Minor modifications to portions of the Red Cedar Area, resulting in no impact to the original cost-effectiveness analysis, as presented in the 1991 Project Plan.
- Early work proposed at the WWTP, allowing the City to further optimize WWTP operation and ultimately provide greater protection to the Grand River.
- Early separation of Pere Marquette Street in Subarea 020, to mitigate surface flooding and reduce the public health threat associated with basement flooding.

Project Plan Supplement II

- The Foster Avenue Interceptor project was divided into north and south sections at Michigan Avenue. The north section was constructed in Phase II, Segment 2. The construction was divided into two sections to allow an alternative route analysis for the northern section to minimize impact to trees, while allowing the south half to proceed.
- WWTP improvements were moved forward into Segment 1 from Segment 2 of Phase II, to provide improved plant operation earlier.
- Rehabilitation of the twin 90-inch portion of the express outlet to the Red Cedar River was moved into Segment 2 from Segments 3-5 of Phase II, due to concern for the pipe integrity under I-496.
- Separation of Red Cedar Area I was moved into Phase II, Segment 3 from Phase III, to reduce cost and minimize environmental impact by combining the I and J separation projects.
- Tollgate Drain (Red Cedar Area L) separation and Groesbeck Golf Course Stormwater Detention was moved back to Phase II, Segment 3 from Phase II,

Segment 2. This portion of the project was not ready to proceed under that time frame. This delay resulted in no violation of permit requirements.

- The proposed Red Cedar Area K trunk sewer route was revised to coincide with the proposed MDOT roadway reconstruction. The new route connects with the Foster Avenue Interceptor at Fairview and Grand River Avenues. Combining this work with the roadway reconstruction reduced the temporary impacts associated with construction activities.
- The main sanitary interceptor for CSO Subarea 018 was moved forward into Phase III, Segment 1, from Phase IV. This work did not require any work to be delayed from an earlier phase to a later phase. This interceptor is the primary sanitary outlet for Subarea 018, and its construction enabled smooth implementation of Subarea 018 separation. This interceptor allows existing and proposed new separate sanitary flows from the Lake Lansing Road area to flow directly to the WWTP, without mixing with combined sewage in CSO Subarea 018. Finally, the interceptor is deep enough to have allowed abandonment of the Lake Lansing Road Sanitary Pump Station, thereby eliminating energy and O&M costs associated with that station.
- The work at the Lansing Avenue Pump Station Site was revised to replace LAPS in Phase II, Segment 5, and construct an equalization basin at the same site in a subsequent Phase if needed.

AMENDMENT NO. 2

- The City of Lansing accelerated sewer separation in the Capitol Loop project area, as shown in Figure 1. The City partnered with MDOT and their road reconstruction and streetscaping project in the Capitol Loop area. By making construction of the road improvements and the sewer separation as part of the same project, the total CSO project cost and the amount of the SRF loan was reduced and the project area was disturbed only once. The sewer separation in the Capitol Loop area was included as part of Phase IV, Segment 1. This area was originally scheduled for CSO separation in Phases IV and VI. No work was delayed to accommodate this project acceleration.
- During preliminary design investigation it was discovered that a cross-connection existed between CSO Subareas 034 and 037. Sewer separation construction for Subarea 037 was scheduled to begin in 2002, as part of Phase III, Segment 4.

Subarea 034 is scheduled for separation in Phase V (2008 – 2015). The DEQ agreed that the cross-connection (CSO Overflow 034-A) may be left open to avoid increasing the risk of basement flooding in Subarea 034 during the interim period.

- The Moores Park Trunk Sewer (MPTS) provides the primary sewage outlet for CSO Subareas 034 and 037. Construction of MPTS was moved forward into Phase III, Segment 2 from Segments 3 – 5 to enable implementation of sewer separation in Subarea 037.
- Routing of the Northeast Sanitary Interceptor serving CSO Subarea 018 was changed slightly to reduce cost and improve constructability. Separation of a portion of High Street was included with the project to coordinate with proposed street reconstruction.
- As determined in Project Plan Amendment No. 1, the timing for the construction of the Lansing Avenue Equalization Basin would be delayed to a future phase to ensure that the basin would be sized appropriately. Subsequent flow data from ongoing and future sewer separation projects will be used to finalize the required size of the basin. The City is also considering pursuing disconnection of footing drains throughout the City's separate sanitary service area. If this were to occur, the basin would likely become unnecessary.
- Field investigations and design considerations have resulted in minor revisions to boundaries between various subareas, to accommodate actual flow directions, and other site conditions. These boundary changes fine tune the overall CSO program schedule, and do not negatively impact the project. The Capitol Loop project serves as an example of this.

In summary, all Amendment No. 2 changes have either resulted in no change, or acceleration of the CSO control program schedule, with no associated delays. The overall program work scope has also remained the same.

AMENDMENT NO. 3

The following items are included as changes since Amendment No. 2:

- In response to concerns about access to downtown raised by the business community in conjunction with the beginning of the Capitol Loop Project, the Mayor's Office established the 2020 Infrastructure Task Force. A major activity

of this group was to evaluate the segmentation of the downtown portion of the CSO Project Plan and its impact to the business community. The meetings, public input, and recommendations of the Task Force are contained within the November 2004 Final Report. The primary change recommended by the Task Force was to bring portions of the downtown projects forward in the schedule to allow smaller downtown projects. The smaller projects will have less impact on the businesses and allow for improved access during construction. The modifications to the schedule will still allow elimination of CSO regulators according to the schedule contained in the NPDES Permit. The Final Report was supported by City Council by passage of Resolution # 152 on April 11, 2005. The report was also was reviewed with DEQ with a final copy provided. Other changes resulting from the Downtown 2020 Task Force recommendations include:

- Subarea 045 was recombined into a single project in Phase IV, Segment 5 instead of split between Phase IV, Segments 3 and 5. This change was made to better control vehicle access to downtown.
- Subarea 020 was moved from Phase IV, Segment 3 to Phase IV, Segments 4. This change was also made to better control vehicle access to downtown.
- Subarea 013 West was moved ahead from Phase IV Segment 4 to Phase IV Segment 3 due to splitting the 013 North area into multiple project areas. In order to complete the 013 area during Phase IV this required moving 013 West forward one year.

Other changes since Amendment No. 2 include:

- Design and construction of the proposed LAPS sanitary equalization basin is further deferred to allow evaluation for the need of the basin and the required size. This will also allow the City to consider the need for the basin in conjunction with the Sanitary Sewer Overflow (SSO) Control Program. If the City implements the proposed footing drain removal program in separate sewer areas, a basin at LAPS will likely become unnecessary.
- Beginning with Phase III Segment 4, Subarea 037, the Lansing Board of Water & Light (BWL) began significant participation in the CSO projects to update aging

water and steam pipes. Design and construction of the CSO projects incorporated the BWL water, steam, and chiller lines to better coordinate the City's utility infrastructure while streets are disrupted for the sewer construction.

In summary, all changes since Amendment No. 2 have either resulted in no change, or acceleration of the CSO Control Program schedule to eliminate the CSO regulators, with no associated delays. The overall program work scope has remained the same.

CSO CONTROL ALTERNATIVES

The 1991 CSO Project Plan included three alternatives, complete separation, maximum retention, and partial retention. This section compares the alternatives based on findings and costs observed since the CDM peer review was completed in 1998.

COMBINED SEWAGE RETENTION

There are two options considered for retention, including the 1991 Project Plan criteria and one of the proposed options included in the 1998 CDM Report that allowed smaller basins. Both options are based on the sewer needs addressed in the 1991 Project Plan, which sought to provide a 10-year conveyance capacity for the combined retention areas. The cost of basins is based on the updated CSO Basin Cost Chart by CDM that incorporated several Michigan projects to establish the cost curve. This is included in Appendix B. Following is a description of each retention option.

Retention 1

Retention option 1 was prepared on the basis of the design storm used in the 1991 Project Plan which included the capture of the 1 year/1 hour storm and 30 minutes detention of the 10 year/1 hour storm. This design basis met the requirements of the NPDES Permit at the time the Project Plan was prepared.

Retention 2

Retention option 2 was prepared on the basis of the design storm proposed by CDM in their 1998 study of capture of the 1 year/1 hour storm with no additional detention. This option requires reduced storage capacity, and would result in more frequent discharge to the Grand River.

Other Considerations

Based on experience in the older combined sewer areas of the City, considerable rehabilitation of existing pipes may necessary to make them structurally sound and serviceable. No rehabilitation cost has been incorporated into the overall cost opinion for retention. Since the base cost opinion for retention is greater than separation, adding rehabilitation costs will only further support separation as the cost effective alternative.

Subarea 022 West and Capitol Loop were removed from consideration in all CSO alternatives, as sewer separation has been completed in these areas.

Since the cost of retention is found to be greater than the cost of separation, a life cycle cost comparison was not completed. As indicated in the 1991 Project Plan and again in the 1998 CDM Report, consideration for operational and replacement costs are greater with retention and would only make the retention options more costly.

Basin Sites

Property costs for siting of the basins have not been included. The original site for subareas 021, 022, 024, 046 was the park area at River Street and Lenawee, along the Grand River. This site is still available for a retention area.

The original site for subareas 008, 009, 012, 015, 019 was an area at the Wastewater Treatment Plant. This site is now occupied by the City for a biosolids storage facility. With limited space on the WWTP site, another alternative will be needed. One potential option would be the vacant area south of Willow Street on the General Motors property.

The original retention plan for subareas 032 and 034 called for two basins, with the 032 basin located on the old Diamond Reo property, and the 034 basin at Moores River Park. Subarea 034 is undergoing separation at this time. Since the 1991 Project Plan was completed, the Diamond Reo property has been developed and there may not be space available for a basin. If space is not available, an alternate location would have to be found which could require rerouting the basin to Moore's Park via large diameter sewers and enlarging the basin for 034.

Retention Status

Table 2 summarizes the status of CSO subareas originally considered for combined retention in the original 1991 CSO Control Project Plan.

TABLE 2

SUMMARY OF 1991 PROJECT PLAN COMBINED RETENTION SUBAREAS

CSO Subareas Considered for Retention in 1991 Plan	Original Plan Basin Size, million gallons	Current Status	Comment
013	4.2	Partially separated	▪ Retention not considered ▪ Only 34% not separated or under construction
008, 009, 012, 015, 019	7.0	Subareas remain combined	▪ Consider retention ▪ Original basin site at WWTP no longer available
021, 022, 024, 046	3.0	Subareas partially separated	▪ Consider retention ▪ Capitol Loop area completed ▪ Other separation beginning in 2007
033	2.0	Subarea remains combined	▪ Retention not considered ▪ GM closing site and will separate in the process
035, 036, 038	1.1	Subareas separated	
016, 017, 018	5.0	016, 017 remain combined. 018 90% separated	▪ Retention not considered ▪ 018 was only area to be retained and separation almost complete
041, 042, 043, 044	4.0	Subareas separated	
032, 034, 037	7.0	▪ Subarea 037 separated. ▪ 032 and 034 remain combined	▪ Consider retention for 032 & 034 ▪ Consider retention only for 032 ▪ 034 separation design has started ▪ 034 sanitary trunk sewer already constructed

SEWER SEPARATION

The sewer separation alternative is based on sewer length estimated for the projects in the 2020 Infrastructure Report of 2004, and is greater than included in the 1991 Project Plan. The updated separation cost opinions are also based on:

- actual bids for Phase IV, Segments 2 – 4
- projected costs included in the 2020 Segmentation Table
- cost projections incorporated in the 2003 Sanitary Sewer System Master Plan Study, including increased footing drain allowance in the remaining areas to be separated
- rehabilitation is now an eligible cost and is included in the separation option

Most areas remaining to be separated will allow for an increased footing drain flow rate of 7,200 gallons per parcel per day, which is based on findings and recommendations of the 2003 Master Plan Study. This allowance is expected to provide conveyance for a 25-year dormant season rainfall event.

ALTERNATIVE COST OPINIONS

Table 3 compares the cost effectiveness of separation and retention of the subareas still viable for retention consideration. The conceptual cost opinions are based on the January 2007 ENR index of 7880 and include only SRF eligible sewer activity. They do not include ineligible funding for additional road, sanitary, storm sewer activity, collection system rehabilitation funding for retention options, or Board of Water & Light (BWL) eligible or ineligible activity. Cost opinion back-up information is included in Appendix B.

TABLE 3

CONSTRUCTION COST COMPARISON - AREAS VIABLE FOR COMBINED RETENTION

CSO Subareas	Sewer Separation	Retention 1 1991 Project Plan Capture 1-yr, 1=hr 30 Min 10-yr, 1-hr	Retention 2 CDM 1998 Capture 1-yr, 1-hr storm
008, 009, 012, 015, 019	$54,819,000	$75,864,000	$65,588,000
021, 022, 024, 046	$69,609,000	$93,706,000	$90,939,000
032 and 034 (No 037)	$61,868,000	$86,715,000	$61,758,000
032 (No 037 or 034)	$19,714,000	$29,224,000	$22,841,000

Notes:

- The cost figures are based on SRF eligible activity and does not account for other ineligible activity related to sanitary sewers, storm sewers, and roads
- The cost figures do not incorporate any participation by the BWL, either eligible or ineligible.
- The retention options do not include the purchase of property if needed for locating it, special treatments if located in a park, nor sewer system rehabilitation.
- The costs are only for construction of the facilities and do not take into consideration long term operation, maintenance and replacement (OM&R) costs. OM&R costs tend to be higher for facilities and equipment than for sewers.

CONCLUSIONS / RECOMMENDATIONS

Sewer separation remains the most cost-effective alternative to control CSOs in Lansing. Although separation costs are higher in the downtown areas, experience to date has found that separation is feasible in the downtown areas, and remains more cost effective than providing combined sewer relief and CSO retention.

The combined retention alternative provides conveyance capacity for the 10-year rainfall rather than the 25-year event capacity provided in the sewer separation alternative. Based on this, the combined retention alternative would likely result in significantly more frequent basement flooding in retention areas.

It is recommended to continue sewer separation throughout the remaining combined sewer areas in Lansing.

REMAINING WORK

Through FY 2006 the City of Lansing has received 19 SRF loans for the construction of CSO Control projects. The terms of the SRF program require that an environmental review of segmented projects be performed by DEQ covering a five-year period. This amendment includes Phase IV, Segments 4 and 5 and Phase V, Segments 1-3.

Phase IV, Segment 4 CSO Subareas beginning construction in the spring of 2007 include:

- 013 Northwest – Turner and Carrier Street area
- 020 – Shiawassee Street, east of the Grand River
- 018 Southeast – Porter and Ballard Streets
- Downtown Area – including portions of Kalamazoo and Seymour Streets, and the 200 and 300 blocks of north Washington Square

The proposed work for the next five segments will complete all projects on or before the schedule proposed in the original Project Plan. No separation work is being delayed from an early phase to a later phase. The proposed retention basin at Lansing Ave Pump Station is being deferred from Phase IV to Phase VI as well as any additional work at the Wastewater Treatment Plant to allow for evaluation in conjunction with the SSO Control Program. Figure 1 shows completed, ongoing, and remaining work. Table 4 shows remaining work for Phases IV, V, and VI.

MONETARY COSTS

Table 4 also summarizes the project cost opinions for all future segments. The cost opinions include engineering and a 10 percent contingency for construction. The opinion of total project cost for the next five segments is $146.9 million. The opinion of eligible project cost for the five segments is $102.6 million. The opinion of total project cost for all remaining work is $240.8 million.

Cost to Average Residential User

The estimated monthly cost to a typical residential user for the next SRF loan (Phase IV, Segment 5) is $1.20.

TABLE 4

LANSING CSO CONTROL PROGRAM REMAINING WORK

Phase	Segment	Description	Project Period	Construction Start Year	Opinion of Eligible Project Cost ENR 7880 Million $
	4	Separation of Subareas 020, 018SE, 013NW, and Downtown	2005 - 2010	2007	26.0
	5	Separation of Subareas 045, 018SW, 013NE, 034A and Downtown	2006 - 2011	2008	19.1
V	1	Separation of Subareas 015N (014), 034B, and Downtown	2007 - 2012	2009	17.0
	2	Separation of Subareas 034C, 032 Trunk, and Downtown	2008 - 2013	2010	19.2
	3	Separation of Subareas 015S (014), 034D, and Downtown	2009 - 2014	2011	21.4
	4	Separation of Subareas 034E, 032 Local and Downtown	2010 - 2015	2012	16.6
	5	Separation of Subareas 009 (010) and Downtown	2011 – 2016	2013	16.7
VI	1 - 5	Separation of Subareas 008, 012 (011), 016, 017, 019, 026, and 033, and completion of downtown separation for Subareas 021, 22 E, 024, and 046 (047), Lansing Ave Retention Basin. Improvements to the WWTP	2012 – 2020	2014 – 2018	105.1

- The project period generally includes 1.5 years for design and DEQ approval, 2 years for construction and 1 year for PPC monitoring and report.
- The need for a basin and improvements at the WWTP will depend on flows from separated areas and the approach the City takes to address Sanitary Sewer Overflows.
- Construction costs include 10% contingency
- Eligible project costs have been approximated to include 70% of the total project cost

DESIGN CRITERIA

The final design drawings and construction permit for the Phase IV, Segment 4 projects have been approved and are on file with DEQ and City of Lansing.

The Draft Basis of Designs for the Phase IV, Segment 5 projects are on file with DEQ and the City of Lansing. Similar basis of design reports will be developed for each successive segment.

PUBLIC PARTICIPATION

A public hearing on the Draft CSO Project Plan Amendment No. 3 was held on Thursday, May 17, 2007, at 7:00 p.m. in the Lansing City Council Chambers to receive comments from interested parties. A notice of public hearing was published in the *Lansing State Journal* on Sunday, April 15, 2007 and the *Lansing City Pulse* on Monday April 16, 2007. Copies of the Draft CSO Project Plan Amendment No. 3 were made available for public inspection by the publication date of the notice of the public hearing. The period for receipt of written comments also ended on Thursday, May 17, 2007.

The following items are included in Appendix C:

- Public hearing and written comment advertisement and affidavit
- Hearing agenda
- Executive Summary handout
- List of attendees
- List of Speakers
- Transcript of hearing
- Responsiveness summary addressing questions and comments received
- Resolution adopting selected plan, passed by Lansing City Council

APPENDIX A

NPDES Permit

APPENDIX B

Cost Opinion Information

APPENDIX C

Public Participation Documentation
And Resolution of Adoption

APPENDIX D

Population and Income Data